next one -- can you go to the next slide? The next slide is another procedure, ORAUT-OTIB-0010, and here you have -- in -- in table 4.1 you have also as a standard assumption for overestimating doses an exposure to organ dose of at least equal to or greater than one, and then it also has in addition to that, a missed dose cycle of 0.4, which is basically LOD. Now this -- this is not a measured dose, but it is also a maximal dose. In other words, LOD is -- as a default value for missed dose (unintelligible) 95th percentile. So again here in this case we are assigning a -- a -- an exposure organ factor at least greater than one -- equal to or greater than one in conjunction with a missed dose that is also 95th percentile value. So again a high DCF does not preclude the use of a second maximizing parameter such as either using -- using an uncertainty or in this case using LOD as opposed to LOD over two. The next slide is a similar one and that involves -- these two -- these two particular procedures, one is applicable to TLD and the other one is applicable for film dosimeters. And again, if you look at 5.2 you have again a

-- a -- you can -- you can use a standard overestimating factor of two, which basically says multiply the recorded dose by two, and then you are still in a position to use a DCF that is greater than -- than one.

So we have basically three procedures here that allow you to assign a DCF value of one or greater as a generic value, in conjunction with either a -- the inclusion of an uncertainty if you use measured dose, or in these two cases you can overestimate the dose by a factor of two. And so I will take exception to the statement that the use of a higher than recommended DCF value, as noted in Appendix (unintelligible) does not preclude the use of an uncertainty.

Your comments?

MR. HINNEFELD: Well, Stu Hinnefeld here. The --

THE COURT REPORTER: This is Hinnefeld?

MR. HINNEFELD: Hinnefeld, yeah. The statements that -- that I -- as I -- as I follow the procedures here, were sort of allowing. As even Hans said, these procedures allow the use of these mul-- these

(unintelligible) uncertainty. And it's not clear to me that they necessarily dictate the use of the uncertainty factor (unintelligible) and they don't preclude it. So they leave the question open as to whether it should be done or not, but they don't specifically say one way or the other. Okay, so they don't give specific guidance or not.

From a philosophical approach to saying that -- well, in one case they do say apply appropriate distribution, the one -- the one you cited, which was procedure six. The other two TIBs -- TIB 8 and TIB 10 are both definitively pro-- for providing maximum potential estimates, and they are silent. They don't say anything about applying the appropriate distribution in their description, so they kind of leave it open as whether to apply it or not. So philosophically, the way we have (unintelligible) -- okay? I don't know if we wrote this in the procedure anyway, but the way we have (unintelligible) is that if you have overestimated the dose components, (unintelligible) dose components, then you may enter that as a constant on an -- on the IREP

calculation because you have confidence that -- that the value is no higher than that. So you've -- you've overestimated and you have confidence that the value is no higher than what you are entering for that dose. And as the IREP samples (unintelligible) at random for its iterative sampling and selects that value every time, rather than selecting a value from a distribution which is all lower, you are providing an overestimate to the element of probability of causation for the claimant. So philosophically, that's the way we (unintelligible). And procedurally it's not -- may not be specifically described that way, but that's the way we (unintelligible) for overestimated approach.

DR. H. BEHLING: Just another comment. On the other hand, as I'd mentioned to you, if you look at the DCF that might have been chosen for the colon, and I'm only going to give you a single value 'cause I don't have the lower and upper bound, but the DCF for that value that they might have selected would have been 0.747, or about 25 percent less than the DCF. Now on the other hand, if you look at some of the

early times of film dosimeters, the uncertainty was far in excess of 25 percent, so had the individual used the real DCF, which would not have been considered claimant favorable, but then was forced to assign an uncertainty, the chances are he would have come up with a higher number than the default value of a DCF of one and not include the uncertainty for the dosimeter value, so quite honestly, as claimant favorable as it may sound, it's probably not claimant favorable if you would have looked at the alternative which would have been we'll follow Implementation Guide 001 (unintelligible) say let's take the dosimeter dose and assign an uncertain (sic) to them and then use (unintelligible) DCF value which in this case would have been 0.747, because we're only talking about a 25 percent difference. And the truth is, the uncertainty for some of those early dosimeters is probably well in excess of 25. So this would have been considered to be a neutral position as opposed to a claimant favorable position.

MR. HINNEFELD: I think we'd like to -- the opportunity to do some evaluation of what the

actual outcome of such -- of the various treatments is, so I -- I understand your point and I think it's a well-argued point. I think it's a -- I'm sorry, my voice naturally drops when I give a compliment. I think it's a --

DR. H. BEHLING: (Unintelligible) can't see that.

MR. HINNEFELD: I think it's a well-argued point, but I would like -- it's not going to -- you know, I think Hans said it's not real clear which way it -- what happens when you do that, when you apply a distribution and the DCF versus a DCF of one and a constant, it's not real clear what happens on the POC calculation. So we'd like to maybe take the -- a few (unintelligible) evaluating that as -- as part of our discussion.

DR. H. BEHLING: Okay, issues two and three I think we can kind of sum those two up, Stu.

MR. HINNEFELD: Okay. Issue number two is a statement about missing dosimetry data in the record that was available for this claimant. And issue number three is that the misinterpretation of the DOE dosimetry record led to errors in the missed dose

reconstruction, and those comments are correct. So we feel like we did have an additional record that gave us the total exposure of this person --

DR. H. BEHLING: Annual dose.

MR. HINNEFELD: The annual dose, so we did not have the read by read results, and as a result of that and as a result of some other factors, the missed dose calculations for this dose reconstruction were done incorrectly. We've subsequently redone it and the probability of causation is about 45 percent from about 40 percent, so we -- so this one we really needed to chase down right away because there was a fair amount of missed dose that had been omitted from the dose -- I know why that happened. I don't know if anybody cares, but we know why that happened.

DR. H. BEHLING: No comment from me, unless somebody else has --

MR. GRIFFON: Yeah, Mark Griffon. I just have a comment or maybe a clarification. I didn't really review this case as one of my cases. The missed dose versus unmonitored dose, these were all missed doses?

MR. HINNEFELD: This person was clearly monitored for the duration.

MR. GRIFFON: You said you had a annual -- you had annual information but didn't have the individual readings?

MR. HINNEFELD: (Unintelligible) a couple of years.

DR. H. BEHLING: Hans Behling. Just for clarification, when you have an annual -- for instance, if there were 12 cycles -- in other words, there were 12 monthly TLDs or films that were read on behalf of this individual, only one may have been a positive one to give you a yearly positive, with the remaining 11 being zero. Or they could have all been spread over the 12-months which (unintelligible) you had no missed dose. So when you look at a summary sheet that says for the year -- let's say 1973 this individual had 240 millirem, you could have had 12 reads each of 20 or thereabouts, or you could have had one of 240 with 11 zeroes, in which case if you ignored the missed dose, you would ignore or short-change this individual for 11 zero doses by which you would have to assign missed dose.

MR. GRIFFON: Right, Mark -- Mark Griffon. You just -- for a clarification on my point, I'm not saying zeroes. I'm asking about blank -- if there were any blank (unintelligible) missed cycles and -- 'cause that's a different issue if they went -- for some reason (unintelligible) and he was supposed to be monitored, that's missing data as opposed to (unintelligible) zero where you would apply (unintelligible).

UNIDENTIFIED: This seems to be a case where we got two pages of a report that said --

THE COURT REPORTER: Who is this?

UNIDENTIFIED: Okay. We had page one --

THE COURT REPORTER: Who is this?

UNIDENTIFIED: -- page two of four and then nothing --

THE COURT REPORTER: Excuse me, who is that?

MR. HINNEFELD: This is Stu Hinnefeld.

THE COURT REPORTER: Is that Hinnefeld? Okay.

MR. HINNEFELD: I'm sorry, Ray. Oh, Ray, how are we doing? Are we behaving better and can you get us okay?

THE COURT REPORTER: There's a new problem. It's back to that sounding like there's a fog

reading that was less than half of the badge's limit of detection. And we should have counted that as a non-detect, as a zero, and included it in the missed dose calculation. In this case we did not. It was counted as an actual dose, so that reading was not counted as a zero when in fact it should have been. And that is a true comment and that is correct.

DR. H. BEHLING: And just for clarification for -- for Wanda, normally when we have missed dose it's usually assumed that the dose came back as a zero dose. Now if you have, for instance, a badge -- and for this individual I had -- I have identified for the year a total of I think all but one dose came back as less than LOD over two, meaning that doses as little as two millirem that month was a recorded dose.

MS. MUNN: Uh-huh.

DR. H. BEHLING: We realized that -- let's assume just for -- for conservative reasons that at the time the LOD value was 40 millirem. If he had had a zero dose instead of two millirem, he would have been given 40 divided by two, which is 20 millirem assigned as a missed dose, which is 18 more than the real

dose that he was recorded of -- of two.

MS. MUNN: Right.

DR. H. BEHLING: So in essence, he was punished for having a positive dosimeter dose that was unfortunately less than LOD over two.

MS. MUNN: Right.

DR. H. BEHLING: Just for your clarification.

MS. MUNN: Yeah, thank you. I appreciate that.

DR. H. BEHLING: Okay. Issue five, Stu?

MR. HINNEFELD: Issue five was that the assigned neutron missed dose couldn't be duplicated, and from the explanation in the dose reconstruction, I could understand why it couldn't be duplicated. But we did evaluate and look into what the dose reconstructor had done, and the key difference appears to have been that the Hanford neutron badge provided a result for both a slow neutron and a fast neutron value. So on any -- on a particular badge cycle on the neutron badge, there'll be a column for slow neutrons and a column for fast neutrons. And the -- so the dose reconstructor then essentially counted that as two zeroes if there were a zero in both columns. They're considered independently un-- you know, less

than detectable results. And the -- so he recorded that as two, and so that would provide a factor of two multiplication, which I believe was what was identified, as (unintelligible) by a factor of two.

Complicating the interpretation of this was the dose reconstructor's approach of assigning all neutron doses, missed or measured, into a particular energy range, the most radiologically effective energy range, as an overestimating assumption. And so there was no separation on the IREP input sheet of the slow and fast neutron missed dose. It was consolidated into one energy. That complicated the interpretation of -- of the dose reconstruction, but I believe that explains --

DR. H. BEHLING: Yeah.

MR. HINNEFELD: -- why -- why we arrived at what we arrived at.

DR. H. BEHLING: Okay. I'm not sure if Stu is

6, and it gives you basically instructions for calculating neutron doses before and after 1971. That's a pivotal point. Before 1972 NTA* film was used, which everyone sort of believes was not reliable enough. And post-1972 a TLD was introduced that was reviewed as reliable in recording neutron doses. And in that particular before-1972 time frame the neutron dose was to be calculated using the photon dose and using the neutron/photon dose ratio as a surrogate for actual empirical neutron measurements. And somehow or other that formula does not jive with the need to segregate neutron doses below 100 keV and above 100 keV. So I'm not sure that the (unintelligible) entry of zeroes is the justification for entering the neutron dose twice, because it's really supposed to be based on photon/neutron ratio and using of -- the use of the empirical photon dose. Post-1971 the HMPD dosimeter was to be used, and for that you'd essentially take the minimum detectable level and divide it by two, as defined in table 6-31. So in short, for either missed neutron dose or a dose that was actually potentially

recorded by means of the HMPD TLD badge, the method of doubling that dose is not appropriate, at least from the procedures that I'm looking at here.

MR. HINNEFELD: Well, there's a -- there's a mistake in the Technical Basis Document (unintelligible) this table because the numbers -- and there is an additional table, 6-30, that is the photon limits of detection (unintelligible). This table 6-31 which purports to tell the photon limits of detection for use in the photon to neutron ratio method contained a factor of two error for several years. So the actual photon limits of detection are half that, and so the -- that was an error that in -- in response to your comment, when we were investigating this, we evaluated that. These values in table 6-30 -- 6-30 are the actual photon limits of detection, and so they are in fact lower than what appears in 6-31, which is the neutron table, but it relies on photon limit of detection in its technique, as you've correctly described.

DR. H. BEHLING: What do we do with this thing?

MR. HINNEFELD: Correct that table, and we --

we have a revision in -- underway.

DR. H. BEHLING: Okay.

MR. GRIFFON: Is that the only resolution? Is that table correct (unintelligible)?

DR. H. BEHLING: Well, as I said, I'm not in agreement with counting -- you say the dosimetry data that was -- this is Hans Behling for you, Ray. The dosimeter data that was received from the DOE records a whole bunch of things. For film or TLD it records the shallow dose or deep dose and for neutron it gives you values for -- for low energy neutrons and high energy neutrons, and in each case, even though it was a dosimeter that was assigned to that person for that time period, the -- the counting of two zeroes and then making a -- making those two zeroes count as if they were two independent is, in my estimate, overestimating the actual dose -- of missed neutron dose. I mean (unintelligible) on using the photon/neutron ratio method or, in the case of MDL over two when you know what the neutron -- you know, for the post-1972 era, using it twice is basically giving him a gift that he doesn't deserve, based on these procedures.

MS. MUNN: I agree.
DR. H. BEHLING: Don't you agree? I mean --
MR. HINNEFELD: I think so. Yeah, I think I agree. I think I agree.
DR. H. BEHLING: So the table in itself is -- is a need-to-do for the purpose of correcting the procedure --
MR. HINNEFELD: Right.
DR. H. BEHLING: -- but I think in this dose reconstruction, the guy has double-counted the zeroes that should not have been. And for missed dose he should have said what is the MDL after for neutron badge and then divide that by two and whatever and then assign that, rather than counting the zeroes twice.
MR. HINNEFELD: With what I know today, I agree.
DR. H. BEHLING: Okay.
MR. HINNEFELD: Although I may learn -- I may learn something later that causes me to question everything again. I do that every day.
DR. H. BEHLING: Okay.
MR. GRIFFON: This is Mark Griffon. I -- I think -- I think I agree with that, too. I

think it sounds like there was double-counting but -- so you'd have to do it once --

THE COURT REPORTER: Mark, I'm having a real hard time hearing you.

MR. GRIFFON: Sorry. As I -- I think I agree with that. I think -- it sounds like there was possi-- or probably double-counting in this case, but I think you have -- is it -- in these procedures do you -- are you able to resolve then how to split the energy? Is that -- is that sort of dependent on -- on the time frame or how -- how do you resolve that? You --

MR. HINNEFELD: What energy neutron we assign to --

MR. GRIFFON: Right.

MR. HINNEFELD: Well, for the dose reconstruction, the entire neutron dose, missed or measured, was assigned to the most radiologically effective energy period -- energy range.

MR. GRIFFON: I thought (unintelligible).

DR. H. BEHLING: Okay.

MS. MUNN: This is Wanda. Even though I have not reviewed this case -- and will not, because it's a Hanford case -- the point that's being

discussed here is one that is cross-cutting, I think. And I certainly, from what I understand of what I believe I heard, I agree that there's a double benefit there that should not continue. The process probably needs to be reviewed.

MR. HINNEFELD: Thank you.

DR. H. BEHLING: Issue six and seven, we can add these two together.

MR. HINNEFELD: Issue number six of first an improperly cited reference and incorrect organ dose assignment for occupational medical exposures, and issue number seven is the same comment about on-site ambient doses versus occupational medical. Our view is that the reference cited is the -- is in fact the reference where these values were taken from. It's not a particularly well-constructed reference. Attachment E doesn't have something at the top of the page that says Attachment E, so -- but it was there and it's listed as Attachment E in the table of contents.

DR. H. BEHLING: Hans Behling. Stu is 100 percent correct. In our write-up we said that there is no such thing as Attachment E that was

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DR. H. BEHLING: Hans Behling. Stu is 100 percent correct. In our write-up we said that there is no such thing as Attachment E that was

written into the dose reconstruction report, and we are wrong and we are right, and we are wrong because it does exist. We're right because the document that was forwarded to us didn't have the Attachment E, which was added later. As you may recall, under task three we had asked for a disk that contained all of the procedures. Now the procedure that was minus the Attachment E was issued in June of 2003, was amended in November 7th of 2003. We asked for that disk of the -- in June of 2004, and we were sent the June 2003 version, which had no Appendix E, so I kept looking at Stu's statement and I'm showing them currently our version of this document, which has no Attachment E. So we're both right and we're both wrong. Okay? It is now -- there is an Attachment E, which I only recently got through the internet when I downloaded and said well, that's a new attachment here and said --

MS. K. BEHLING: (Unintelligible)

DR. H. BEHLING: Yeah, so that issue goes away, but as I said, at the time when we reviewed it the reference to Attachment E didn't make sense to me because our version of ORAUT-PROC-0006

did not have an Appendix E at the time.

MR. HINNEFELD: That explains a lot. I couldn't believe you had overlooked it. Given the way you looked at everything else, I couldn't believe you had overlooked that. Okay. Then we are ready for issue number --

DR. H. BEHLING: Eight.

MR. HINNEFELD: -- eight. Okay. Issue number eight relates to a contamination event that there is a record -- there are records in the DOE response of a contamination event. There are two sheets that seem to relate to the same event -- does that sound correct?

DR. H. BEHLING: Yes.

MR. HINNEFELD: And the -- the subject and the discussion on the -- on the sheet led us to the conclusion that they are related sheets. They are the same event. One describes the decontamination of the person and the resulting results, that he was successfully decontaminated. That was our interpretation of these records that we -- that we got. We also felt like a contamination event that's identified and decontaminated provides a modest intake potential at most, and that this

particular dose reconstruction was performed with the intentionally overestimating TIB-2/to* intake, the internal dose assessment, so we felt like the internal dose for this person was sufficiently addressed in the dose reconstruction.

DR. H. BEHLING: Okay. Again, you know, sometimes it's an issue of interpretation and how you want to view things. But we agree that there was a contamination event involving a worker who had torn his glove. It shows a certain -- a number of -- I can't even be sure what I'm looking at because the document is old. It's difficult to determine whether the actual numbers on that page as we get it from probably third, fourth, fifth generation of photocopy is defined -- the contamination is defined in terms of dpm, cps or whatever it is. It's difficult to -- to really determine what it is. But nevertheless, there was a contamination event. And what is really not really contested here is whether the hand was decontaminated, because we know from experience as an operational health physicist, a skin contamination in itself is usually an

insignificant event from a dosimetric and risk point of view. But what it usually does inform you is that the potential was there for a contaminating event that involves the hand, that some of that contamination might have been transferred to the mouth and therefore ingested. And so my concern here was not so much -- and I don't even question the fact that the hand was decontaminated -- but there was no follow-up in the urinalysis that might have said well, you know, you -- you -- you tore your glove, you got your hand badly contaminated and in the process of undressing or doing whatever following this event, you may have transferred some of that to your mouth and ingested. And coming from utilities and having been involved in the sensitivity of internal contamination, whether it's a break in a facial seal of a respirator, whether it's a positive nasal swipe or a hand contamination, the thing to do normally is to simply say let's go and send you over to a whole body counter if you're talking fission pods, or if you're not talking fission pods, do a urinalysis, just to be sure, on the safe side, that there wasn't an

ingestion or inhalation of -- of contaminants. And so when I looked at that particular person's dosimetry records for internal exposures, all I saw was an annual chest count, an annual urine count, an annual whole body count, which did not coincide -- these were at one-year interval, which meant that clearly, even though this person did have urinalysis done, it did not coincide in time and space with this contamination event. And that's the only issue that I raise is that there was a failure on the part of health physics to follow up on a hand contamination by saying let's also take a urine sample, just to be sure nothing was taken in. And that's really what the purpose of that statement is.

MR. HINNEFELD: Oh, okay.

DR. H. BEHLING: Not so much whether the hand was successfully decontaminated. I'm not really concerned about that, especially from an alpha emitter. But what was the consequence to a potential internal, and the real thing should have -- the -- the -- the proper thing would have been to do a urinalysis as a follow-up to this hand contamination.

MR. HINNEFELD: Right. Correct. We can't, at NIOSH, do anything about that.

DR. H. BEHLING: No, no, we can't, but it was strictly something that says here is a CATI report that identified this. I looked at the old records. I also looked at the record that says -- yeah, they were very successful in decontaminating the hand, but then I said did they follow up and do a urinalysis, just to be on the side of caution, and they did not.

MR. HINNEFELD: But now when we read that comment, to us it implies that there is a dose here -- a significant internal dose issue that is not accounted for in the dose reconstruction. That's the way we would interpret the comment.

Our view is that the internal dose that was assigned to this dose reconstruction, which relied on what we call the TIB-2 intake -- the hypothetical 28 nuclide intake that there's no evidence anyone ever got -- is sufficiently large that it would encompass exposures like this. Not just the one we have documents of, but any others that we don't have to have a document on in this person's record.

So our view is from the dose reconstruction -- you know, granted, we'll agree with your comment that they did not do a very good job in operational health physics on this case. But from a dose reconstruction standpoint, we feel like we have bracketed this person's exposure.

DR. H. BEHLING: Agreed.

MR. GRIFFON: This is Mark Griffon. I'll give you a little different twist on that comment. I think, Stu, you're -- you're -- you're right in the -- that -- your 28 radionuclide (unintelligible) is going to overestimate anyway. On the other hand, you have to remember your -- your, quote/unquote, customer in this situation. And these people that got interviewed over the phone who made these comments -- I think it might behoove NIOSH to specifically address that.

MR. HINNEFELD: Okay.

MR. GRIFFON: In their -- in their review, even if it's to say that -- that, you know, we've considered this, there was no follow-up. However, you know, we've taken this approach to -- to your dose reconstruction using the 28 radionuclides, which is overestimating your

(unintelligible) -- you would never have received that in this situation anyway. At least that says to that individual that they heard me on my interview and they looked into it and they -- and they -- they -- you know, assessed it and included it, 'cause I think down the road we're going to run into this. If they think that they made these, you know, (unintelligible) comments and they're not even spoken to in their report, they're going to say why did I even bother, you know.

MR. HINNEFELD: Right.

MR. GRIFFON: So there is that part, and -- and I'm not saying this to give them lip service.

MR. HINNEFELD: No.

MR. GRIFFON: I'm saying that -- that they should be -- you know, those comments should be addressed (unintelligible) spoken in the report.

MR. HINNEFELD: And I think you'll see as you continue to review dose reconstructions that are prepared later, you will see better addressing of that 'cause that is a point we have made with the contractor is that if they tell us these things happened, we need to

describe to them in the dose reconstruction report how we considered the information they gave us. So I think -- I don't have this one in front of me, I don't think -- I might have it, I've got a couple -- but certainly I think the more recent dose reconstructions you will be able to see better. They said the -- the claimant made this statement and the dose reconstruction addressed that statement in this fashion. I think you'll be able to see that better in later dose reconstructions.

DR. H. BEHLING: Okay. And then just again for your -- your benefit, Wanda, SC&A did these reviews -- we did not really address whether or not a -- a deviancy from the procedure was necessary (sic) going to result in a monumental or even significant or even a marginal increment in dose. It was just looking at the procedures and saying did they follow. Whether or not it was significant to the dose or the probability of causation was not an issue we really were willing to address. We basically looked at the procedures to say were they followed. And if not, even if it was a minor or negligible thing, as you say, the 28